- Rule-Making Effort: Chesapeake Bay Options Workgroup
Data Needs/Research Summary

undated

1.9 Summary of Existing Programs Associated with Minimum Measures Option

Watershed Implementation Plan Summaries

The following are summaries and excerpts from each Chesapeake Bay state's Watershed Improvement Plan (WIP)[1] describing existing programs similar to those proposed for the Chesapeake Bay Provisions of the Stormwater Rule. **Note that the WIPs did not include many specific details on programs individual municipalities were implementing beyond the state requirements.**

Maryland

Source:
http://www.mde.state.md.us/programs/Water/TMDL/Documents/www.mde.state.md.us/assets/document/MD_Phase_I_Plan_12_03_2010_Submitted_Final.pdf

Fertilizer Programs

Maryland has an existing Nutrient Management Law that regulates fertilizer applications on 220,000 acres of commercially managed lawns (for example, golf courses and athletic fields). [Summarized from MD WIP p. 5-8]

Trash/Litter Reduction Programs

Maryland's NPDES stormwater permits include new provisions to implement regional strategies for the elimination of trash. Permit reissuance is underway, scheduled to be completed by March 2011. [Summarized from MD WIP p. 2-26]

Retrofit Programs

Maryland began a voluntary retrofit program in 1984, known as the Stormwater Pollution Control Cost Share Program. This program was expanded in the 1990's with the Small Creeks and Estuary Cost Share Program, and again in 2010 with the Chesapeake Bay Trust Fund. Thousands of urban acres across the State have been retrofit with these funds.

Maryland has written watershed retrofit requirements into NPDES municipal stormwater permits since 1999. These retrofit requirements are based on existing impervious surface area with no or minimal stormwater management. An example of a comprehensive watershed retrofit program and associated BMP data can be found in Baltimore County's most recent NPDES annual report Appendix (WIP, Appendix G2). Previously, 10 percent of a jurisdiction's unmanaged urban areas were required for retrofitting during a five year permit term. Major new provisions of these permits require the restoration of an additional 20 percent of a jurisdiction's impervious surface area; implementing regional strategies for the elimination of trash; and the development of watershed implementation

[1] The WIP for New York was still in draft form at the time of review.

plans, with milestones and schedules, to achieve stormwater WLAs and water quality standards for impaired waters affected by stormwater discharges. MS4 Phase I permit renewals are currently underway and are scheduled to be completed by March 2011.

In 2008, based generally on the 2004 Tributary Strategy, Maryland established a Chesapeake Bay restoration goal to retrofit 40 percent of existing developed lands, or approximately 416,000 acres, by 2020. This acreage estimate was based on the 5.1 version of Chesapeake Bay Model. To meet this schedule, approximately 90,000 additional acres need to be restored by the end of 2011. This is the basis for Maryland's Chesapeake Bay 2011 Milestone for stormwater, which is summarized in Figure 2.1.

To date, Maryland has accomplished approximately 78,856 acres of the Chesapeake Bay watershed restoration goal. Most of these stormwater retrofits were implemented through the NPDES stormwater permits issued to Baltimore City; and Anne Arundel, Baltimore, Carroll, Charles, Harford, Howard, Frederick, Montgomery, and Prince George's counties; and the State Highway Administration. Additional retrofits outside of the federally regulated envelope have been implemented locally and through the former State's Stormwater Pollution Control Cost Share and Small Creeks and Estuary Cost Share Programs and newly created Chesapeake Bay 2010 Trust Fund.

Stormwater Acres Restored

	Goal		Actual	
	2011	Increment	Restored	Remains
2008	129,541	39,541	39,541	90,000
2009	129,541	69,541	53,815	75,725
2010	129,541	99,541	78,856	50,685
2011	129,541	129,541		

[Excerpted and summarized from MD WIP p. 2-25]

Performance Standards for New/Redevelopment

Local governments have adopted ordinances that ensure the necessary authority to implement Maryland's stormwater management laws, regulations, and performance standards.

On-Site Retention/Volume Control (enacted 2000, significant revisions in 2009): Accepted Environmental Site Design (ESD) practices as defined in the Stormwater Design Manual must be implemented to manage the stormwater quality volume, defined as the runoff volume from the 1-inch rain event in the MD Eastern Rainfall Zone and 0.9" in the MD Western Rainfall Zone. (See channel protection requirements as well). (Manual, p. 5.18)

Channel protection requirement (enacted 2000, significant revisions in 2009): Environmental Site Design (ESD) must be implemented to the Maximum Extent Practicable (MEP) to mimic predevelopment hydrologic conditions, defined as woods in good condition, when subjected to a 1-year 24-hour design rain event. This means that ESD practices must provide retention storage sufficient to reduce the runoff depth of the proposed development to that of woods in good condition. Any channel protection volume remaining after the implementation of ESD to the MEP can be managed utilizing the traditional strategies and practices designed in accordance with the State Manual (such as detention ponds, filtration or other treatment structures). (Manual, p. 5.18)

Water Quality requirement (enacted 2000): 40% phosphorous and 80% TSS reduction required. Assumed to be met if on-site volume control requirements are met. (Manual, p. 1.13)

Flood control requirement (enacted 2000): Optional criteria applied at the discretion of the appropriate plan review/approval authority to control the developed condition peak rate of discharge from the 10-year 24-hour design storm event to the pre-development rate. (Manual, p. 2.1)

Redevelopment standard: Any land development project disturbing 5,000 square feet or more where existing land use is commercial, industrial, institutional, or multifamily residential and existing site impervious area exceeds 40 percent must achieve one of the following:

a) Reduce existing impervious area within the limit of disturbance by at least 50 percent according to the Design Manual;

b) Implement ESD to the MEP to provide water quality treatment (1" or 0.9") for at least 50 percent of the existing impervious area within the limit of disturbance; or

c) Use a combination of both a) and b) for at least 50 percent of the existing site impervious area.

Alternative measures may be allowed if the applicant successfully demonstrates implementation of the above to the MEP. (Regulations, 26.17.02.02B(29), p. 6; 26.17.02.05D, p. 13)

Special criteria: Stormwater Management Plan Design: MD Stormwater Act of 2007 requires a comprehensive process at the county and municipal level for approving grading and sediment control plans and stormwater management plans. This is to include a Concept Design and Review Phase, a Site Development and Review Phase, and a Final Plan Design and Review Phase. (Regulations, 26.17.02.04, p. 11)

Groundwater Recharge: The groundwater recharge volume is a fraction of the water quality volume based on the pre-developed hydrologic soil group. Therefore, ESD must be implemented to manage both groundwater recharge and water quality volumes. (Manual, p. 2.1)

MDE/WMA's Sediment, Stormwater, and Dam Safety Program has approved 20 out of 23 Counties (Anne Arundel, Harford and Howard Counties remain) and 38 out 38 Municipalities regarding stormwater management ordinances that comply with revised and updated stormwater regulation. Several of the local jurisdictions are working through their newly elected Council or Commissioners for final adoption of the latest approved changes. In addition, many have engaged in various types of cross-regulation review to help identify and correct conflicts between regulations that are barriers to innovative stormwater management practices.

HSG	USDA Soil Texture
A	Sand, loamy sand, or sandy loam
B	Silt loam or loam
C	Sandy clay loam
D	Clay loam, silty clay loam, sandy clay, silty clay, or clay

[Excerpted and summarized from MD WIP p. 2-25]

Virginia

Source: http://www.dcr.virginia.gov/soil_and_water/documents/vatmdlwip.pdf

MS4 Fertilizer Programs

Virginia offers nutrient management training and certification for turf and landscape professionals. Individuals are certified to develop nutrient management plans consistent with technical criteria and submit summary reports to the state on an annual basis. Guidance and standards are provided in the Virginia Nutrient Management Training and Certification regulations and the Virginia Nutrient Management Standards and Criteria. In 2005, the turf recommendations section was expanded to include detailed recommendations for golf courses, athletic fields, and sod production. There are 65 certified turf and landscape planners and that number is increasing quickly. Certified planners are subject to random inspections of plans prepared to check compliance with promulgated plan criteria. Certificates may be revoked if plans do not meet the criteria contained in the Nutrient Management Training and Certification Regulations. [Summarized from VA WIP p. 82]

Trash/Litter Reduction Programs

None.

Retrofit Programs

None. The authors of the plan acknowledge that this is a strategy that needs to be pursued in the future to meet TMDL goals.

Performance Standards for New/Redevelopment

The 1988 Chesapeake Bay Preservation Act requires localities within Virginia's coastal zone to adopt performance criteria for land development and redevelopment, ordinances that include measures to protect water quality, and development plan review processes that are sufficient to ensure water quality protection. Localities are required to enforce performance criteria for Resource Protection Areas and Resource Management Areas that constitute Chesapeake Bay Preservation Areas, including a 100-foot buffer along waterways. For example, within an RPA and RMA, there are currently requirements for no-net increase in stormwater pollutant loadings from new development and a 10 percent reduction in stormwater loadings from redevelopment. Best management practices must have maintenance agreements. The regulations also require that the site design criteria of minimizing land disturbance and impervious cover, and preserving indigenous vegetation, be incorporated into the local development review process. The regulations also require local governments to include in their comprehensive plans clear local land use policies protective of water quality based on an analysis of physical constraints to development, existing and potential sources of water pollution and shoreline and streambank erosion, among other items. [Excerpted and summarized from VA WIP p. 82-83]

Pennsylvania

Source:
http://files.dep.state.pa.us/Water/Chesapeake%20Bay%20Program/ChesapeakePortalFiles/WIPs/Chesapeake%20Bay%20WIP%20%20November%2029,%202010.pdf

MS4 Fertilizer Programs

The Lancaster County Clean Water Initiative currently conducts Urban Nutrient Management Education, which has been promoting an adult education program that demonstrates proper property maintenance including fertilizer application, animal waste removal and soil conservation. (This information was provided as an example.) [Summarized from PA WIP p. 145]

Trash/Litter Reduction Programs

None.

Retrofit Programs

Retrofits of existing development have been explicitly identified as a gap. The WIP (p. 135) states that future MS4 permits will require MS4 permittees that do not have local waters that are impaired or have a TMDL to target retrofit efforts as necessary to address the target load reductions established for Pennsylvania.

An example retrofit program, the Lancaster County Roof Greening Project, was described to have converted more than 51,000 square feet of impervious area (roof tops) to pervious area by installing vegetated roofs. [Summarized from PA WIP p. 145]

Performance Standards for New/Redevelopment

Pennsylvania utilizes a stormwater strategy that addresses volume and rate of stormwater runoff to address water quality. DEP has developed a volume control standard that is more protective than the recommended federal standards. Pennsylvania regulation requires managing the net change from pre-construction to post construction conditions for the 2-year storm event, where the pre-construction condition is meadow or better. When an existing impervious area is redeveloped, 20 percent of the existing impervious area is considered to be in meadow or better condition for application of stormwater retrofits. This management approach focuses on providing stream channel protection and water quality protection from frequent rainfall that comprise a major portion of stormwater runoff events in the Commonwealth, including the Chesapeake Bay watershed. In addition, DEP requires peak rate control for representative storms, from 1 to the 100-year event to protect against immediate downstream erosion and flooding. Most designs achieve peak rate control through the use of detention structures. Peak rate control can also be integrated into volume control BMPs in ways that eliminate the need for additional peak rate control detention systems. [Excerpted from PA WIP p. 120]

District of Columbia

Source:
http://ddoe.dc.gov/ddoe/frames.asp?doc=/ddoe/lib/ddoe/tmdl/Final_District_of_Coluimbia_WIP_Bay_TMDL.pdf

MS4 Fertilizer Programs

None.

Trash/Litter Reduction Programs

The District's programs to address trash focus on trash collection through street sweeping and catch basin cleaning. The District has identified hot spots of high trash/debris generation that are swept more

frequently. Proposed activities focus on enhanced street sweeping and catch basin retrofits to include trash screens; the District has already retrofitted ~110 catch basins to address trash control in conjunction with enhancements to street sweeping efforts. They also installed two in-stream trash traps and collected 6,585 lbs of trash from Nash Run and Watts Branch. The District also undertook a trash survey and developed a trash removal strategy with the *Anacostia Watershed Trash Reduction Plan*. [Summarized from DC WIP p. 45, 47, 48, and 52]

Retrofit Programs

The 2007 Letter of Agreement outlines several enhancements to the District's stormwater management program, including the following retrofit-related elements:

- Plant at least 4,150 trees per year with a goal of planting and maintaining 13,500 additional trees by 2014 and annually document the survival rate and estimate the storm capture rates (Tree Canopy Goal: increase cover from 35 to 40 percent of city coverage by 2035)
- Install rain gardens and rain barrels city-wide and perform downspout disconnections.
- Complete a structural assessment of District properties maintained by OPM to determine feasibility for green roof installation and submit an implementation schedule for green roof installation. As of June 2010, approximately 600,000 ft^2 of green roofs have been installed. Eleven green roofs totaling 287,491 square feet were approved in FY08 and thirteen green roof projects for a total of 101,766 square feet were approved in FY09. These projects will bring the District's total square footage of green roofs to 720,735 square feet. Current plans to increase that total to 1.2 million ft^2 include 450,000 ft^2 on District Property, 408,000 ft^2 on federal property, 430,000 ft^2 on private property.
    - The RiverSmart Rooftops program provides incentives to help reduce stormwater runoff by providing subsidies to property owners who install a green roof. For projects up to 4,000 square feet of vegetated surface, there is a rebate of $5 per square foot, with each property being eligible for up to $20,000. These projects can be installed on new or existing properties. For projects over 4,000 square feet of vegetated surface, there is a rebate of $7; however, only existing properties are eligible.
- Install environmental catch basins or equivalent BMPs in new road reconstruction projects.
- Commit $1 million annually for catch basin retrofits with vortex separator systems or other structural BMPs determined to be the best practicable technology to maximize stormwater pollution reduction.

The District also has the incentive-based RiverSmart Homes program to encourage stormwater BMP implementation on private property. Homeowners can receive up to $1,200 to install landscape enhancements; they can select from a combination of shade trees, rain barrels, pervious pavers, rain gardens, and BayScaping. To date 1,214 audits have been completed, 725 rain barrels have been installed, 266 trees have been planted, 82 rain gardens have been installed, 25 pervious paver projects and 142 BayScaping installations have been planted. More than 2,000 homeowners are interested in the in the RiverSmart Homes Program and are on a waiting list to have an audit performed for their property. [Summarized from DC WIP p. 39-41]

Performance Standards for New/Redevelopment

Development projects in the District of Columbia currently must meet the following minimum criteria:

- Submit management measures necessary to maintain the post-development peak discharges for a twenty-four hour, two- and fifteen-year frequency storm event at a level is equal to or less than the respective, twenty-four hour, two- and fifteen-year predevelopment peak discharge rate through stormwater management practices that control the volume, timing and rate of flows;
- Where a development is planned in which the stormwater runoff will increase the downstream discharge into an area designated as a flood hazard, as delineated on the *National Flood Insurance Flood hazard Boundary Maps* (FHBM), the developer shall complete an analysis of the downstream peak discharge for a one hundred (100) year frequency storm event, and shall install the appropriate controls to avoid exceeding this peak discharge;
- Where runoff is discharged into an off-site stormwater management facility, the applicant shall provide controls in accordance with those mandate by the District Department of the Environment (DDOE) in the *Stormwater Management Guidebook*
- Any stormwater discharge facility which may receive stormwater runoff from areas which may be potential sources of oil and grease contamination in concentrations exceeding ten (10) milligrams per liter (mg/L), shall include a baffle, skimmer, grease traps or other mechanism which prevents oils and grease from escaping the stormwater discharge facility in concentrations that would violate or contribute to the violation of applicable water quality standards in the receiving waters of the District;
- Any stormwater discharge facility which receives stormwater runoff from areas used to confine animals and which discharges directly into receiving waters shall be designed to prevent at least eighty-five percent (85 percent) of the organic animal wastes from escaping the stormwater discharge facility. The discharge from the facility shall not violate the water quality standards in the receiving waters of the District; and
- All stormwater management plans, shall conform to the District of Columbia's erosion and sediment control plans and flood management plans.

[Summarized and excerpted from DC WIP p. 38-39]

The draft version of the District's new MS4 permit includes a requirement for development sites disturbing 5,000 ft^2 or more of soil to retain the runoff from a 1.2" storm [Summarized from DC WIP p. 43].

New York

Source (draft only): http://www.dec.ny.gov/docs/water_pdf/nydraftphiwip.pdf

MS4 Fertilizer Programs

Legislation was signed into New York law on July 15, 201036, to limit the use residential fertilizer containing phosphorus holds promise to reduce phosphorus in urban runoff.

A new Environmental Conservation Law §17-2103 will prohibit the application of phosphorus fertilizer on lawn or non-agricultural turf, except when: (1) a soil test demonstrates that additional phosphorus is needed for lawn or non-agricultural turf growth, or (2) new lawn or non-agricultural turf is being established. A new ECL § 17-2103 requires retail stores to comply with the requirements of Agriculture and Markets Law § 146-g related to the display of phosphorus fertilizer and the posting of educational signs. It would also prohibit the application of fertilizer on lawn or non-agricultural turf: between December first and April first; on impervious surfaces; and within twenty feet of surface water except where there is a continuous vegetative buffer of at least ten feet from the water body, and except that,

where a spreader guard, deflector shield or drop spreader is used, the application would be prohibited within three feet of a New York surface water. The setbacks from surface water would not apply when establishing a new lawn. This new Title 21 will not impair or supersede the authority of the Commissioner of Agriculture and Markets under Articles 10 and 25-AA of the AML. ECL §17-2105 will allow local governments to adopt more stringent standards for non-agricultural fertilizer applications after demonstrating to the Department that such action is necessary to address local water quality conditions.

Section 4 of this bill will add a new ECL § 17-1945 to provide for the enforcement of Title 21 of Article 17. This new section will provide that a New York owner, owner's agent or occupant of a household who violates a New York provision of Title 21 would receive a written warning and educational materials for a first violation, be liable for a civil penalty not to exceed $100 for a second violation, and be liable for a civil penalty not to exceed $250 for third and subsequent violations. A New York other person who violates a New York provision of Title 21 would be liable for a civil penalty not to exceed $500 for a first violation, and not to exceed $1,000 for each subsequent violation.

Section 6 of this bill will add a new section AML § 146-g to require retail stores that sell or offer to sell to consumers specialty fertilizer in which the available phosphate content is greater than 0.67 percent to display such fertilizer separately from non-phosphorus specialty fertilizer, and to post a sign in the location where phosphorus-containing specialty fertilizer is displayed stating that phosphorus runoff poses a threat to water quality, and therefore phosphorus-containing fertilizer may only be applied to lawn or non-agricultural turf when a soil test indicates a phosphorus deficiency or new lawn or non-agricultural turf is being established. [Excerpted from NY WIP p. 25]

Trash/Litter Reduction Programs

None.

Retrofit Programs

None. The WIP mentions an effort underway to evaluate retrofit cost/effectiveness options (p. 49).

Performance Standards for New/Redevelopment

Construction Stormwater Permit requirements by including post-construction controls to address both water quality (nutrients) and quantity for both development and redevelopment projects, including a water quality performance standard of 80 percent TSS removal 40 percent phosphorus removal. For water quantity, stream channel protection, overbank flood control and extreme flood control criteria are applied. In 2010, New York added rigorous green infrastructure requirements to the Construction Stormwater Permit.

West Virginia

Source: http://www.wvca.us/bay/files/bay_tmdl_documents/50_WV_Final_WIP_I_Nov_29_2010.pdf

MS4 Fertilizer Programs

None.

Trash/Litter Reduction Programs

None.

Retrofit Programs

Urban retrofits are not currently required but they are being considered as a contingency if necessary to meet wasteload allocations. These retrofits will meet the capture requirement of 0.80 inches of rainfall on site with no discharge to surface waters. [Summarized from WV WIP p. 40]

Performance Standards for New/Redevelopment

The post construction minimum control measure of the General Permit directs MS4s to develop ordinances requiring all new development and redevelopment of one acre or greater to capture and manage the first one inch of rainfall by utilizing runoff reduction stormwater practices such as canopy interception, soil amendments, evaporation, rainfall harvesting, engineered infiltration, extended filtration and/or evapotranspiration and any combination of these practices. The permit allows for the MS4 to develop a payment-in-lieu program or offset mitigation to address the runoff reductions.

Redevelopment sites including brownfields, high density, vertical density and mixed use and transit oriented development are provided the incentive (reduction in amount of capture) to capture the first 0.80 inches of rainfall on site with no discharge to surface waters. Each incentive will allow the developer to reduce the amount of stormwater that is required to be managed on site. A maximum reduction of 0.75 inches is allowed. [Excerpted and summarized from WV WIP p. 34-35]

Delaware

Source:
http://www.wr.dnrec.delaware.gov/Information/WatershedInfo/Documents/Chesapeake%20Phase%201%20WIP/DE_PHASE1_WIP_11292010.pdf

MS4 Fertilizer Programs

In regards to the control of fertilizer use throughout the state, the Delaware Department of Transportation is working with the Appoquinimink Watershed Association to pilot a program to help reduce fertilizer run-off from households. Research has shown that 72 percent of homeowners who hire landscapers to care for their yards have them apply fertilizers and often those requests are made in the spring. This program is designed to encourage and reward lawn care professionals who follow best practices that will reduce fertilizer run-off while meeting homeowners' needs and educating them on best practices. Although this program is only being piloted within one area in Delaware, this program could possibly be expanded to the entire state and into the Chesapeake Bay Watershed if found to be successful. [Excerpted from DE WIP p. 71]

By 2012 the Department will adopt a voluntary homeowner education and commercial lawn-care certification program, which includes:

- Keep fertilizer and grass clippings off any impervious surfaces. This may involve sweeping granules and clippings back into the grass from sidewalks, driveways and other areas after application.

- Leave behind educational lawn care material and explain to the homeowner that he/she needs to follow the provided lawn care guidelines when performing any lawn care on their own, in order to maintain the integrity of the program.
- For new lawns, test the soil for phosphorus, potassium and pH to determine the specific needs of the lawn before application.
- For established lawns, test the soil once every three years for phosphorus, potassium and pH to determine the specific needs of the lawn. (For developments, one home per development can be tested every 3 years.)
- For all lawns, do not apply phosphorus or potassium if soil test levels are above optimum.
- Make sure spreaders are applying the correct amount of fertilizer and record the pounds of nutrient applied to each lawn.
- All lawn care companies are required to submit the following once per year:
    - Name, address and contact information of lawn care company
    - Five random soil tests
    - Total number of new customers who chose your company due to this program's certification
    - Total area of lawns maintained
- Meet ALL the nitrogen and phosphorus application in the following table.

Turfgrass Species	Max Amount of Nitrogen Over Entire Year	Suggested Application Rates and Timings When Using Fertilizer Containing Less than 50% SAN	Suggested Application Rates and Timings When Using Fertilizer Containing More than 50% SAN	Limitations on Use of Phosphorus
Cool Season Grasses (e.g., Tall Fescue, Perennial Rye, Fine Fescue, Kentucky Bluegrass)	3 lbs/1,000 ft^2	March/April: 0.5 lbs/1,000 ft^2 Sept: 1 lb/1,000 ft^2 Oct: 1 lb/1,000 ft^2 Nov: 0.5 lb/1,000 ft^2	Aug: 1.5 lbs/1,000 ft^2 Oct: 1.5 lbs/1,000 ft^2	Aug: 1.5 lbs/1,000 ft^2 Oct: 1.5 lbs/1,000 ft^2
Warm Season Grasses (e.g., Bermudagrass, Zoysiagrass)	3 lbs/1,000 ft^2	May: 1 lb/1,000 ft^2 June: 1 lb/1,000 ft^2 July/Aug: 1 lb/1,000 ft^2	May: 1.5 lb/1,000 ft^2 July: 1.5 lbs/1,000 ft^2	

Notes:
SAN – slowly available nitrogen
In addition to the requirements outlined above, lawn care companies certified with this program should provide a copy of resident's soil test to them so they understand how the lawn care company is fertilizing their lawn based on test results; use turf-type tall fescue for new seeding; and use slow-release fertilizers.

[Excerpted from DE WIP p. 90-91]

Trash/Litter Reduction Programs

None.

Retrofit Programs

Delaware will be requiring a retrofit program in the next Phase I permit for New Castle County and the Delaware Department of Transportation, though there are no retrofit requirements currently. [Excerpted and summarized from DE WIP p. 70-71]

3.1, 3.2 Summary of existing retrofit programs and requirements in the Chesapeake Bay watershed

This document summarizes the retrofit programs and requirements of two MS4s in the Chesapeake Bay – Arlington, Co. and Montgomery, Co.

CWP Retrofit Manual
Available at http://www.cwp.org/documents/cat_view/68-urban-subwatershed-restoration-manual-series/89-manual-3-urban-stormwater-retrofit-practices-manual.html
Arlington County used this Manual in their program.

Arlington County, VA – Little Pimmit Run Watershed Retrofit Plan
http://www.co.arlington.va.us/departments/EnvironmentalServices/cpe/page75627.aspx

Goals:
The objectives of the retrofit project is at
http://www.co.arlington.va.us/departments/EnvironmentalServices/cpe/documents/file75629.pdf

Table 1. Retrofit Objectives	
Description	**Primary Objectives**
Target Runoff Capture Volume	1. Retrofits shall help decrease peak flows and runoff volumes[1] of stormwater from the drainage areas they capture. The specific peak flow and volume reduction targets include the channel protection volume and specific flood control volumes (e.g., 10 year storm).
Target Pollutant Removal Volume	2. Retrofits shall treat the water quality volume to reduce pollutants of concern from the sites they capture. These may include nutrients, bacteria, sediment, or other forms of land-based pollutants.
Runoff Reduction	3. Where the target runoff capture volumes cannot be achieved, retrofits shall promote overall reduction in runoff volume to the extent achievable.
Pollutant Removal	4. Where the water quality volume cannot be treated, retrofits shall promote overall pollutant removal to the extent achievable.
Description	**Secondary (Community Benefits) Objectives**
Drainage Problems	5. Retrofit designs shall work towards alleviating existing drainage problems when feasible.
Aesthetics, Safety	6. Retrofits shall be well-integrated into their surroundings and not cause any risk to public safety.
Education and Outreach	7. Provide outdoor learning and community outreach opportunities on public lands.
Habitat	8. Create desirable wildlife habitat areas.
Naturalization and Recreation	9. Support existing greenway, trail, and stream corridor naturalization efforts, while not interfering with existing active recreational uses.
Land Acquisition	10. Identify potential land acquisition opportunities that would enable the construction of retrofits or of new stormwater BMPs.

Goals and screening rules are listed at
http://www.co.arlington.va.us/departments/EnvironmentalServices/cpe/documents/file75630.pdf

Timeline/Milestones:
No specific timeline found (two retrofits are being designed and constructed this year)

Why the retrofit plan was created:
Nothing specific found.

Types of practices/cost pollutant reduction info available:
The retrofit plan included primarily bioretention practices, but also included swales, harvesting, stormwater planters, impervious removal and underground detention in a few locations.

The retrofits will treat approximately 9% of the land area in the west branch (11.4% of the impervious area) of the Little Pimmit Run watershed, and 5% of the land area in the east branch (5.2% of the impervious area). Given that the potential retrofits will treat only 9% of the west branch and 5 % of the east branch, phosphorous and nitrogen removal at the watershed scale is somewhat limited. The potential retrofits will reduce phosphorous and nitrogen loads in the watershed by about 4%. Other pollutants, including petroleum products and metals, are expected to be reduced by similar proportions.

A table was developed estimating pollutant reduction for each retrofit location.

Analyses undertaken:
The retrofit plan included ten ranking factors with a weighted point system:
http://www.co.arlington.va.us/departments/EnvironmentalServices/cpe/documents/file75628.pdf

40 potential retrofit sites were identified.

Capital and O&M costs:
No information found.

Public Outreach:
Two public workshops held, and dedicated website created.

Montgomery County, MD – Hawlings River Watershed Restoration Action Plan
http://www.montgomerycountymd.gov/content/dep/downloads/hawlings.pdf

Goals:
County's water quality goals (from Montgomery County Code, Chapter 19, Article IV):

- Protect, maintain, and restore high quality chemical, physical, biological, and stream habitat conditions in County streams that support aquatic life and uses such as recreation and water supply;
- Restore County streams damaged by inadequate stormwater management practices of the past by re-establishing the flow regime, chemical and physical conditions, and biological diversity of natural stream systems as closely as possible through improved stormwater management practices;
- Work with other jurisdictions to restore and maintain the integrity of the Anacostia River, the Potomac River, the Patuxent River, and the Chesapeake Bay; and

- Promote and support educational and volunteer initiatives that enhance public awareness and increase direct participation in stream stewardship and the reduction of water pollution.

Timeline/Milestones:
No information found.

Why the retrofit plan was created:
To identify opportunities to enhance and protect aquatic and riparian habitat in the Hawlings River watershed and to reduce sediment and associated nutrient loadings to the Rocky Gorge Reservoir. Major watershed problems include:

- Uncontrolled runoff that in some intensely developed areas has increased post-development stormwater peak discharges by more than 2000%;
- Lack of or inadequate riparian buffers and unstable stream banks and channels throughout the watershed; and
- Need to improve water quality and quantity control benefits of some existing SWM ponds.

Types of practices/cost pollutant reduction info available:
Dry ponds/extended detention facilities and wet ponds.

Analyses undertaken:
County completed a Countywide Stream Protection Strategy in 1998, evaluating aquatic life and stream channel habitat indicators from over 200 monitoring stations. Almost 1,300 of the County's 1,500 stream miles were monitored

Identified 12 stream restoration and 3 stormwater management retrofit projects.

Capital and O&M costs:
No information found.

Public Outreach:
Unclear how the County involved the public in the development of the plan. Public was involved in reforestation and riparian buffer plantings.

Montgomery County, MD MS4 Permit Requirements
http://www.mde.state.md.us/programs/Water/StormwaterManagementProgram/Documents/www.mde.state.md.us/assets/document/MO%20CO_MS4_Permit.pdf

Watershed Assessments. Part III.F of the MS4 permit requires the County to conduct a detailed assessment of each watershed in the County (at the twelve-digit subbasin level). The watershed assessments are required to address:

- Current water quality conditions
- Identify and rank water quality problems
- Identify and prioritize structural and nonstructural water quality improvement opportunities
- Results of a visual inspection of the watershed
- Specify how restoration efforts will increase progress toward meeting TMDLs

- Specify how restoration efforts will be monitored
- Provide an estimated cost, implementation schedule and benchmarks for anticipated pollutant load reductions
- Include public information component

Two watersheds were required to be assessed within one year. The remaining watersheds to be assessed on a schedule developed by the County.

Watershed Restoration. Part III.G requires the County to implement the practices identified in the watershed assessments. By the end of the permit term, the County is required to complete implementation of efforts initiated during the previous permit term to restore 10% of the County's impervious area. By the end of the permit term, the County is also required to restore an additional 20% of the County's impervious surface area (for a total of 30%).